

## Chapter 2

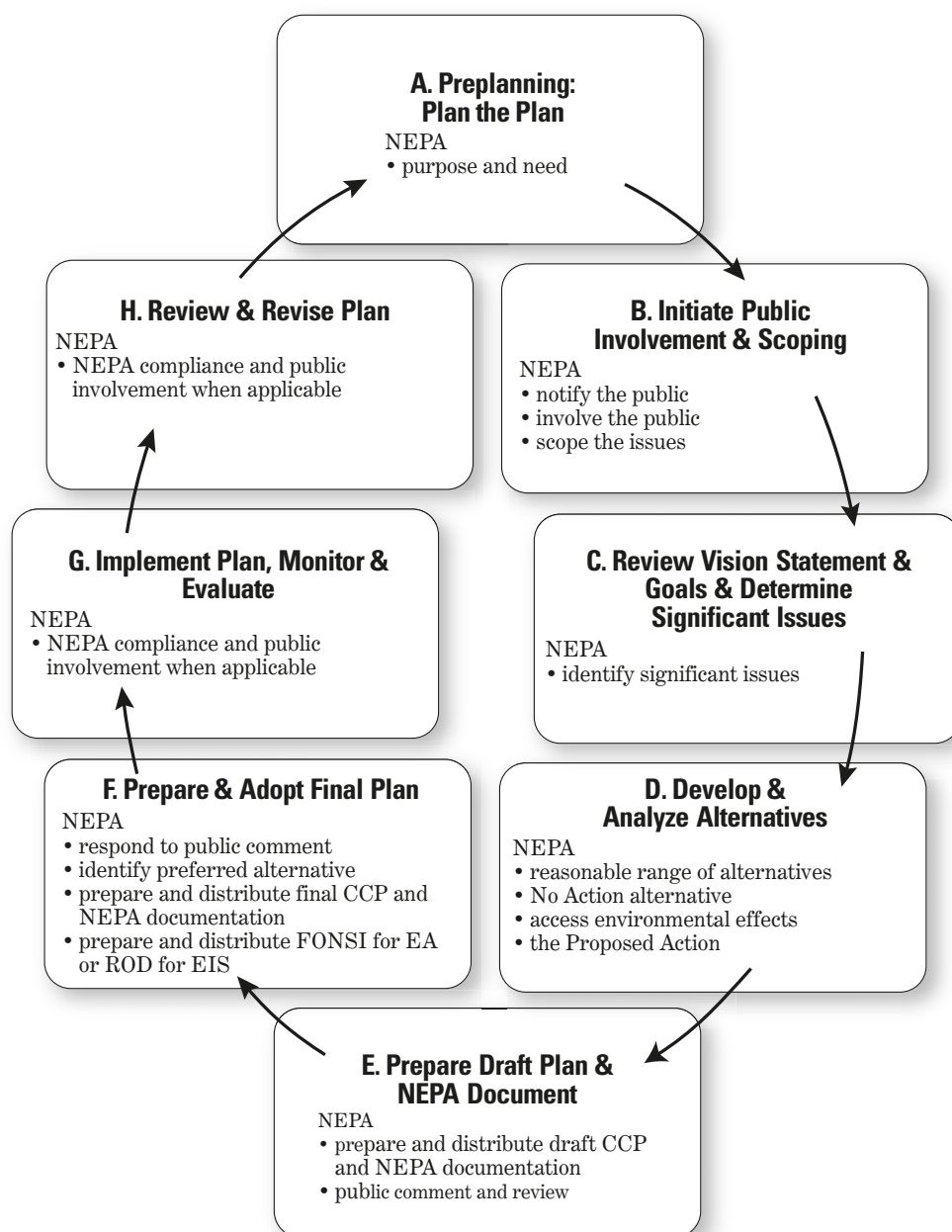


*Pintail duck*

# The Comprehensive Conservation Planning Process

## The Comprehensive Conservation Planning Process

Service policy establishes an eight-step planning process that also facilitates our compliance with NEPA (Figure 2.1).<sup>1</sup> Our planning policy and CCP training course materials describe those steps in detail. We followed that process in developing this final CCP.



**Figure 1.1. The Comprehensive Conservation Planning Process**

In 2001, we initiated the planning process by collecting information on refuge resources and mapping its habitats. We undertook the following actions to complete planning steps A-D.

<sup>1</sup> 602 FW 3, “The Comprehensive Conservation Planning Process” (<http://policy.fws.gov/602fw3.html>)

- Held first CCP core team meeting in September 2001; drafted a vision statement and identified preliminary issues.
- Hosted an intra-agency Visitor Services Station Evaluation in September 2001.
- Hosted an intra-agency Biological Program Station Evaluation in October 2001.
- Published a Federal Register Notice of Intent (NOI) in June 2002.
- Distributed a planning newsletter in spring 2002 to announce project kick-off, and share draft vision statement.
- Held public scoping meetings in June 2002.
- Distributed a planning newsletter in spring 2003 summarizing public scoping comments and announcing project would be put on hold to complete other regional CCP projects overdue.
- Held a conservation priorities workshop with regional experts in November 2006.
- Distributed a planning newsletter in December 2006 to announce CCP process reinitiated, and share draft goals.
- Published a Federal Register NOI in January 2007 to announce CCP process reinitiated.
- Hosted a public meeting in January 2007.
- Held a series of CCP team meetings to develop alternatives from February– June 2007.
- Consulted with Service and state experts in analyzing the alternatives during June 2007 to June 2008.

As part of the planning process, we also evaluated Service fee-owned lands on the refuge for their possible inclusion into the National Wilderness Preservation System. We completed that evaluation in 2007 with the recommendation that we not proceed further with a wilderness study because we determined that refuge lands do not meet the criteria for eligibility. Please refer to the draft CCP (Appendix D) for the results of our assessment.

We completed “Step E: Prepare Draft Plan and NEPA document,” in September 2009 by publishing our Notice of Availability (NOA) in the Federal Register announcing the release of the draft CCP/EA and by distributing it for a 52-day public review and comment period. We also distributed a planning newsletter announcing the NOA and availability of the draft CCP/EA, as well as information on the public comment period and how to submit responses. During the 52-day period of public review, from September 9 to October 30, 2009, we held a public meeting in Rock Hall, Maryland to obtain comments. We also received comments by regular mail, electronic mail and telephone. We then reviewed and summarized all of the comments we have received and developed our responses. These are presented in appendix H.

We submitted this final CCP to our Regional Director for his review and approval. He determined that a Finding of No Significant Impact (FONSI) was appropriate, and certified this final CCP meets agency compliance requirements, achieves refuge purposes, and helps fulfill the mission of the Refuge System. With an affirmative FONSI and other positive findings, the Regional Director approved the final CCP. We published another Federal Register NOA to announce the availability of the final plan, completing “Step F: Prepare and Adopt a Final Plan.”

We can now begin “Step G: Implement Plan, Monitor and Evaluate” with the approval of this CCP. We will modify the final CCP as warranted following the procedures in Service policy (602 FW 1, 3, and 4) and NEPA requirements as part of “Step H: Review and Revise Plan.” Minor revisions that meet the criteria for categorical exclusions (550 FW 3.3C) will require only an Environmental Action Memorandum. We must fully review and revise this CCP every 15 years.

## Development of Issues

Because the refuge is part of the CM Refuge Complex, we are addressing its management goals, opportunities, and planning issues in the larger context of the Refuge Complex, as well as in terms of the refuge’s own unique location, history, and resource attributes. In developing the issues to be addressed during development of this Eastern Neck Refuge CCP, we reviewed the whole array of issues addressed during the Refuge Complex CCP process and brought forward those that were directly relevant to Eastern Neck Refuge management. We added issues identified in the 2002 and 2007 scoping phases done specifically for Eastern Neck Refuge and those that were identified in our public participation efforts.

The CM Refuge Complex CCP planning team identified four major issue areas:

*Issue Area 1.* Potential effects of an expanding human population and changing demographics on Service trust resources;

*Issue Area 2.* Potential effects of land acquisition and refuge expansion;

*Issue Area 3.* Potential effects of habitat changes; and

*Issue Area 4.* Potential effects on floral and faunal populations.

We do not plan to acquire additional lands or expand Eastern Neck Refuge under this CCP, so we did not include a discussion on Issue Area 2. On the other hand, we noted that the CM Refuge Complex CCP does not address cultural or historic resources as an issue. A substantial number of cultural and historic resources are known at Eastern Neck Refuge, and others are likely to be found in the future. Therefore, because we need to protect those Federal trust resources while meeting our primary wildlife trust responsibilities, we identified them as a separate issue area in this CCP.

In formulating the final list of key refuge issue areas to address in this CCP, we framed them as questions for objectivity, clarity, and ease of understanding. Each is discussed in more detail in the narrative that follows.

Eastern Neck refuge key issue areas are:

*Issue Area 1.* How can we most effectively address ongoing threats to refuge habitats and native fish and wildlife species?

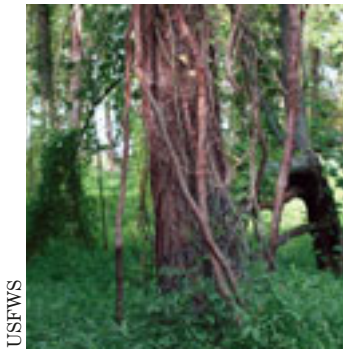
*Issue Area 2.* What species and habitats should be our management priority, how should we manage to benefit them, and what other environmental values can we support?

*Issue Area 3.* How can we address the effects of expanding human populations and increasing recreational demand in the Chesapeake Bay region on Service trust resources at the refuge?

*Issue Area 4.* How can we best address potential effects on cultural and historic resources?

**Issue Area 1. How can we most effectively address ongoing threats to refuge habitats and species, including those from Climate Change?**

*Two invasive species: Japanese stiltgrass (on forest floor) and mile-a-minute*



USFWS

There are substantive threats to the wildlife species and habitats of the refuge that must be addressed in any plan that seeks to manage refuge resources to benefit wildlife and allow wildlife-related public uses. Significant shoreline erosion threatens the integrity of the island and surrounding tidal marsh habitats. Permanent habitat loss is potentially the end result. Protecting the refuge's shoreline is our highest priority and immediate management concern. The long-term success of any management activity we propose for wildlife or refuge habitats, whether it is in wetlands or uplands, depends upon our ability to reduce shoreline erosion and tidal marsh loss. All of these concerns, and actions we take to address them, also need to be evaluated in light of long-term climate change impact predictions. Rising sea level, rising air and water temperatures, increased intensity of storm events are a few of the major changes that could influence the future integrity, diversity, and health of our habitats and the species that depend on them.

Pollutants and erosion also threaten the submerged aquatic plants and shallow water habitats that support waterfowl and other species in the lower Chester River basin near the refuge. Invasive plants threaten refuge tidal marsh and upland habitats. We address this issue area through our management objectives and strategies under goals 1 and 2.

Invasive and exotic species are also a current threat to refuge habitats. Much of the refuge's uplands are inundated with numerous invasive or exotic plants that outcompete native vegetation. The loss of native vegetation compromises the habitat quality for many wildlife species.

**How can we best mitigate shoreline erosion and wetland loss?**

Past studies have shown that the Bay shoreline is severely eroding in many areas (USACOE 1986, VIMS 1977, Singewald 1946). Particularly hard hit are the islands off the Upper Eastern Shore of the Bay. Since colonial times, at least 10,800 acres have been lost in the middle-eastern portion of the Bay alone. The shoreline recession rates of many islands exceed 10 ft per year, with an associated load of approximately 2,500 tons of sediment per mile annually entering the Bay (Offshore and Coastal Technologies 1991).

Loss of brackish tidal wetlands is occurring along the refuge shoreline due to erosion. This has been mitigated on the bayside by a recent Army Corps of Engineers project that placed a series of breakwaters with small inlets, behind which vegetation restoration is underway. In an area restored with clean dredge spoil material, volunteers planted *Spartina alterniflora* and other wetland grasses in an attempt to improve the habitat, restore lost wetlands, and reduce future erosion.

Erosion on the Chester River side threatens SAV beds and the island, particularly at Hail Point. Hail Point Marsh, which is designated as a Research Natural Area (RNA), provides 130 acres of undisturbed marsh for waterfowl and

other wildlife. It is also a concentration area for a significant number of monarch butterflies migrating through the area each year.

In 2009, a “living shoreline” restoration project was initiated to try to stem erosion. A monitoring program is in place to document the effectiveness of restoration activities. Our discussion below about predicted climate change impacts describes further challenges related to addressing erosion and loss of wetlands.

#### **How can we protect and restore submerged aquatic vegetation (SAV) and shallow water habitat?**

Water clarity and SAV health at the refuge also are being impacted, and some of the most important waterfowl wintering habitat in the region is being lost. The presence of SAV beds is one of the most significant determinants for sustaining waterfowl populations. Unfortunately, these beds are very susceptible to pollution, poor water quality, and shoreline erosion described above. Nutrients entering the Chester River from farm fields, septic systems, and other sources stimulate algae growth, which blocks sunlight required by SAV for photosynthesis. Subsequent plant decay consumes the water’s dissolved oxygen — a process that can result in “dead zones” where oxygen-dependent organisms can no longer survive. A bi-weekly water quality monitoring program was instituted in 2003 on the refuge at Bogles Wharf. The most significant parameter of the water quality testing program is turbidity which impacts the health of SAV and dependent biota.

Unless the related problems of erosion and SAV loss are addressed, the refuge’s value as a natural environment within the Bay will severely diminish. Actions we can take to address this problem effectively and efficiently, and what level of resources we can commit to this issue, are included in chapter 4.

#### **What are the best strategies to control invasive and exotic plants and animals on the refuge?**

Non-native or exotic plants introduced from other parts of the world or other parts of the country have degraded many natural ecosystems and are a major problem for the refuge. Invasive plants can spread rapidly, smothering or out-competing native vegetation. Ecosystems impacted by invasive, non-native plants have a reduced ability to clean air and water, stabilize soil, buffer floods, and provide wildlife food and shelter.

Invasive plants at the refuge are a significant problem; they are established on over 50% of refuge lands. These plants are prolific, often overtopping and choking out other plants and depleting or eliminating valued wildlife habitats. The refuge currently has 15 species of invasive plants; four considered as species of concern: mile-a-minute, *Phragmites*, Johnsongrass, and Canada thistle weed. Invasive species of concern are actively controlled; the refuge tracks the spread and control of invasive plants utilizing Geographic Information Systems (GIS), Global Positioning Systems (GPS), permanent vegetation monitoring plots, and photo points. In 2006, 400 out of a reported 1,250 acres of land infested with invasive plants were treated on the refuge. Treatment successfully controlled invasive plants on 50 of these 400 acres.

We are currently studying the effectiveness of a series of control measures on five invasive plant species by monitoring for five seasons (summer/fall) post treatment from 2007 to conclude fall 2011. At issue is how we can most effectively and efficiently utilize limited refuge resources to control invasive plant species. Total eradication is probably not possible for many species. Mile-a-minute and *Phragmites* are the most problematic at the refuge in terms of their impacts on



native environments. Some species, such as Japanese honeysuckle, are exotic and may be somewhat invasive, but may not directly impact refuge management objectives. Invasive plant control actions are included in chapter 4, “Management Direction and Implementation,” in the section, “General Refuge Management,” and in the strategies for objectives 1.1.2, 1.3.1, 1.3.2, and 2.1.3.

Please refer to chapter 3, “Refuge and Resource Descriptions,” for a more detailed discussion of the mile-a-minute and *Phragmites* problems on the refuge.

As we mentioned in chapter 1 under the discussion on the “Mute Swan in the Chesapeake Bay: A Bay-wide Management Plan”, invasive, exotic mute swans were identified as one of the highest ecological concerns among conservation partners. Their ability to out-compete native waterfowl for food and nesting habitat can result in significant resource impacts. We describe these impacts and our plans for controlling this species in chapter 4, “Management Direction and Implementation – General Refuge Management.”

**What actions can Service staff implement on refuge lands to minimize the projected impacts to habitats and species from global and regional climate change?**

Climate change is an issue of increasing public concern because of its potential effects on land, water, and biological resources. The issue was pushed to the forefront in 2007 when the Intergovernmental Panel on Climate Change (IPCC), representing the world’s leading climate scientists, concluded that it is “unequivocal” that the Earth’s climate is warming, and that it is “very likely” (a greater than 90 percent certainty) that the heat-trapping emissions from the burning of fossil fuels and other human activities have caused “most of the observed increase in globally averaged temperatures since the mid-twentieth century” (IPCC 2007). According to the Northeast Climate Impacts Assessment team, “continued warming, and more extensive climate-related changes to come could dramatically alter the region’s economy, landscape, character, and quality of life” (NECIA 2007).

Other predicted major climate-related changes beyond warming air temperatures, include changing patterns of precipitation, significant acceleration of sea level rise, changes in season lengths, decreasing range of nighttime versus daytime temperatures, increasing water temperatures, declining snowpack, and increasing frequency and intensity of severe weather events (NECIA 2007). In the Chesapeake Bay region, the implications of sea-level rise are the most disconcerting within the next few decades. According to the National Wildlife Federation in their technical publication “Sea-Level Rise and Coastal Habitats in the Chesapeake Bay Region (2008),” the Chesapeake Bay region “...is one of the most vulnerable places in the nation to the impacts of sea-level rise.”

The ramifications of sea-level rise in the bay area, most notably erosion and saltwater intrusion, are exacerbated by the low-lying topography, growing coastal population, and the naturally-subsiding coastal lands (NWF 2008). The EPA reports that in the region, erosion rates caused by sea-level rise will be “... higher than those that have been observed over the past century” (EPA 2009). Of increasing concern is that fact that rising sea-level is causing saltwater intrusion into estuaries and freshwater areas, reducing the diversity and extent of saltmarsh habitat, killing trees and other vegetation, and threatening many plant and animal species dependent on a certain level of salinity (NWF 2008). The ability of saltmarsh to migrate inland, or establish at higher elevations as sediment builds up in other areas, is severely hampered by the level of development and shoreline armoring that has occurred in many areas of the Chesapeake Bay.

Since wildlife species are closely adapted to their environments, they must respond to climate variations, and the subsequent changes in habitat conditions, or they will not survive. Unfortunately, the challenge for wildlife is complicated by increases in other environmental stressors such as pollution, land use developments, ozone depletion, exotic species, and disease. The NWF reports that a decline in saltwater marsh, and SAV and eelgrass beds will adversely impact the nursery and spawning habitat of many fish species, shellfish beds, waterbird and waterfowl wintering and breeding habitat, and aquatic mammals and reptiles such as Federal-listed sea turtles, the endemic diamondback terrapin, beaver and otter.

Many wildlife professionals and conservation organizations recommend we manage refuge lands using an adaptive management framework, and increase biological research, monitoring and inventories. According to the NWF, these actions are important for land managers to undertake in order to reduce our vulnerability and to build in the flexibility to effectively respond to the uncertainty of future climate change effects. Ultimately, we hope our management will reduce environmental stressors, provide support for self-sustaining populations, and ensure widespread habitat availability through land protection and conservation.

**Issue Area 2. What species and habitats should be our management priority, how should we manage to benefit them, and what other environmental values can we support?**

The refuge contains about 1,200 acres of upland habitats, 1,000 acres of wetlands, and approximately 80 acres of open water supporting a wide diversity of native plant and animal species. Chapter 3, “Refuge and Resource Descriptions”, describes the habitat types and associated species in detail.

Our mandated Service management priority is to protect and sustain Federal trust resources including wetlands, migratory birds, endangered and threatened species, and interjurisdictional species. With that general requirement in mind, we need to decide how best to meet the needs of the particular priority species present on the refuge and the habitats that sustain them. To facilitate that decision making, we conducted a habitat management workshop on January 17, 2007, that convened biologists and resource managers from Federal and State agencies, and the academic and research community. The results of that workshop are reflected in these issue discussions. We address this issue area through our objectives and strategies under goal 1.

**What Species should be our Management Priority?**

*Waterfowl*

Most wildlife biologists and stakeholders at the January 17, 2007, meeting believed the focus of wildlife management at the refuge should continue to be for the benefit of migratory and wintering waterfowl. The refuge was established to host a large variety of migratory birds, particularly waterfowl, and is a major staging and over-wintering area for tundra swans. The refuge’s marshes and surrounding waterways host waterfowl year round, including one percent of the world’s tundra swan population. The AP Canada geese are a focal species on the refuge. The Chester River over-winters approximately 100,000 AP Canada geese — more than any other area on the East Coast. Thousands of those Canada geese utilize the refuge, which offers sustenance as well as sanctuary. This population was once considered the largest Canada goose population in North America and the staple of waterfowl hunters in the Atlantic Flyway. Winter indices approached one million birds by the mid-1980s and annual harvests often exceeded those of any duck species. However, between 1986 and 1995, the wintering Canada geese in the Atlantic Flyway declined from 900,000 to 650,000 although numbers of “resident” Canada geese increased.



Breeding surveys of nesting areas in northern Quebec documented a more precipitous decline in AP Canada goose numbers from 118,000 nesting pairs recorded in 1988 to 90,000 in 1993, 40,000 in 1994, and 29,000 pairs in 1995. This dramatic change in numbers of AP geese, greater than 75 percent in less than a decade, prompted State, Federal, and Provincial wildlife agencies in 1995 to suspend the sport hunting season of AP Canada geese in the United States and in the Canadian Provinces of Ontario and Quebec. Since the ban was placed on sport hunting during the 1995 hunting season, the status of AP Canada geese appears to have improved substantially from the low of 29,000 pairs estimated in 1995 (Serie and Hindman, 1997).

Our task was to determine the amount of resources we should commit to benefiting waterfowl, and what specific management actions we should undertake to achieve the greatest benefit.

*Federal-Listed, or Recently De-listed, Endangered and Threatened Species*

The Endangered Species Act clearly mandates that we manage for Federal-listed species. Refuge lands contributed to the recovery of the peregrine falcon and the Chesapeake Bay bald eagle populations. Both species have been removed from the Federal list, but they are still afforded protection under migratory bird laws. Presently, the only Federal-listed species occurring on the refuge is the endangered Delmarva fox squirrel (DFS).

In conjunction with other Service experts we explored the potential to undertake recovery efforts for the Federal threatened northeastern beach tiger beetle and Puritan tiger beetle, but there appears to be limited potential for recovery on the refuge due to a lack of suitable habitat. Should we learn more in the future, we would reconsider implementing efforts for those two species.

Bald Eagle. In 2006, Eastern Neck refuge provided nesting habitat for seven active pairs of bald eagles. Current management actions include inventory and monitoring of nesting pairs, protection of nest trees, and prohibiting human disturbance to nesting pairs. Because the refuge supports nesting bald eagles, we can continue our role in supporting eagle productivity. There may also be opportunities to expand our role for wintering and roosting eagles.

Our task was to determine what we can effectively do to benefit this species, including active management, monitoring or additional inventories.

Delmarva Fox Squirrel. We describe in chapter 3, “Existing Environment” the history of DFS management on the refuge. The introduced refuge population peaked in the 1970’s and early 1980s, but is now close to zero. Over the last five years, we have not pursued active management for this species because refuge staff and the DFS Recovery team determined actions were ineffective. In addition, together with the Recovery Team, we have recently determined that supplementing the refuge population through translocations of squirrels back onto the refuge is an action not deemed essential to DFS recovery and would be more effective in other locations within its range.

Our task, however, was to work with the Recovery Team to determine what level of monitoring or inventory effort should be in place to protect those that remain. We will continue to consult with the Service’s Chesapeake Bay Ecological Services Office and other members of the Recovery Team to remain current on this species’ recovery and any future role the refuge could play.

*Interjurisdictional Aquatic Species*

Fish in rivers and coastal waters move across boundaries of states and nations; individual governments are unable to effectively manage or conserve these interjurisdictional fisheries. To coordinate actions of multiple governments,

interjurisdictional organizations have been formed voluntarily, by treaty, or by act of Congress. The Service, through the Fish and Wildlife Management Assistance program, works cooperatively with these organizations to conserve, restore, and manage fish stocks and the habitat on which they depend. In coastal waters, organizations like the Atlantic States Marine Fisheries Commission were formed by Congress to address interstate fisheries issues.

The Atlantic States Marine Fisheries Commission (<http://www.asmf.org/>) was formed by the 15 Atlantic coast states in 1942 in recognition that fish do not adhere to political boundaries. The Commission serves as a deliberative body, coordinating the conservation and management of the states shared near shore fishery resources — marine, shell, and anadromous — for sustainable use.

The Commission's Interstate Fisheries Management Program (ISFMP) began in 1981, with the signing of a cooperative agreement with the National Marine Fisheries Service (NMFS). Currently, the ISFMP coordinates the conservation and management of 22 Atlantic coastal fish species or species groups.

American eel	Horseshoe crab	Spot
American lobster	Northern shrimp	Spotted seatrout
Atlantic croaker	Red drum	Striped bass
Atlantic herring	Scup	Summer flounder
Atlantic menhaden	Shad and river herring	Tautog
Atlantic sturgeon	Spanish mackerel	Weakfish
Black sea bass	Spiny Dogfish & Coastal Sharks	Winter flounder
Bluefish		

For species that have significant fisheries in both State and Federal waters (i.e., Atlantic herring, summer flounder, Spanish mackerel), the Commission works cooperatively with the relevant East Coast Regional Fishery Management Councils to develop fishery management plans. The Commission also works with NMFS to develop compatible regulations for the Federal waters of the exclusive economic zone.

The Chester River provides spawning and nursery habitat for 9 anadromous fish species and 12 interjurisdictional species, 2 of which have State of Maryland endangered species status (FWS & MDFRO 2006).

Horseshoe crab, an interjurisdictional species, is known to spawn in shallow waters on the refuge. Blue crab is another interjurisdictional species found in the Chester River. Spawning for this species occurs during the summer in the shallow waters surrounding the refuge.

We plan to work with our partners to enhance habitat for these species.

#### *State Species of Concern*

The Maryland WDCP (also referred to as the Wildlife Action Plan) lists 502 species of greatest conservation need—that is, fish, amphibian, reptile, bird, mammal, and invertebrate species with small or declining populations or other characteristics that make them vulnerable. Of these, 161 are Maryland State-listed threatened or endangered species.

One example of a species of elevated concern is the diamondback terrapin. Once abundant within the Chesapeake Bay, northern diamondback terrapins are facing a decline resulting from loss of nesting habitat due to waterfront development, erosion control measures, and invasive species; loss of SAV beds providing foraging habitat; commercial harvesting in the areas in which terrapins reside during winter months; mortality from boating and fishing (physical impacts and by-catches); and rising predator populations. Terrapins represent an active commercial fishery managed by the MD DNR. In 2006, emergency legislation

was passed to place new restrictions on terrapin harvest. These restrictions included the banning of winter scraping of hibernacula, the limitation of the terrapin harvest from August to October, and the setting of a slot size limit on the catch. The slot limit protects large females from harvest, but unfortunately, allows capture of smaller terrapins including males.

Our task was to determine what the role of the refuge has in enhancing habitat for these species, in partnership with Maryland DNR.

### **What Habitats should be our Management Priority?**

#### *Managed Waterfowl Habitats*

The refuge's croplands, moist soil units (MSUs) and green tree reservoirs (GTRs) are managed to sustain migrating and wintering waterfowl. MSUs are low-lying, naturally wet, non-forested areas where water is impounded seasonally. On the refuge, late summer precipitation is held by earthen berms to create flooded areas, primarily to benefit fall migratory and wintering waterfowl, and to a lesser extent shorebirds and wading birds. Decomposing vegetation and invertebrates provide a rich foraging area. GTRs are forested lowlands that are temporarily flooded during the fall and winter to attract waterfowl. Flooding occurs when trees are dormant, but when waterfowl are still present and can forage on the acorns and seeds, and macro-invertebrates. Water control structures in GTR areas allow water levels to be manipulated.

Croplands. Currently 557.1 acres of rotational croplands provide habitat for migrating and wintering waterfowl, particularly Canada geese, black ducks, mallards, pintails, and teal. The crop rotation and management practices we use on the refuge's croplands are described in chapter 3, "Refuge and Resource Descriptions". There is controversy about the value to wildlife of maintaining croplands on the refuge as opposed to other less-intensively managed habitat types which could provide waterfowl feeding habitats. Opinions vary as to the amount and distribution of farm fields, the vegetative cover used on the borders between fields, and the particulars of cooperative farming methods. Some people questioned whether this management is consistent with the goals for other refuge resources.

The objective of cropland management on the refuge is to provide extremely important migrating and wintering habitat for the Canada geese, black duck and other waterfowl. The reduction in native foraging plants, such as wild rice and SAV, instigated a program to provide supplemental "high energy" forage, especially during harsh winters and during hunting seasons. The combination of providing an area closed to hunting with readily available forage is a huge attraction for waterfowl. Over the past 2-3 decades, the extent and distribution of the refuge's crop fields was also designed to provide habitat for DFS. Experts had recommended a 2:1 forest to crop ratio as optimal for the squirrels. Now that we propose to no longer focus active management for DFS, we are revising the design of our current cropland management program to focus on benefits for Canada geese and other waterfowl.

Green Tree Reservoirs and Moist Soil Units. The refuge's 38 acres of GTRs provide feeding habitat for wintering and migratory waterfowl, including wood ducks, mallards, black ducks, and teal. In addition, there are currently 30 acres of managed and unmanaged MSUs for Canada geese, black ducks, mallards, teal, and pintail. Conservation organizations such as Ducks Unlimited have advocated for an expanded program, in particular, increasing the acreage and number of moist soil units. Advocates suggest that, in addition to waterfowl benefits, these units can be managed to provide important shorebird and water bird migration habitat. Other opinions expressed include the desire for a reduction in actively managed habitat and a shift in focus to managing for what would be considered

naturally occurring native plant communities typical of Maryland's Eastern Shore and the wildlife those plant communities would sustain.

#### *Forest Habitats*

Prior to European settlement, the Eastern Shore was heavily forested. The predominant forest type was hardwood, most likely oak-hickory, oak-gum, or oak-pine type and increasingly mixed with pine toward the south. Large patches of pine-dominated woods exist today but are largely second-growth forest due to extensive clearing since European settlement. Very little original forest, or "old growth," exists in the region today.

Eastern Neck refuge contains approximately 708 acres of forested land, comprised primarily of loblolly pine, hardwoods, and mature oak-sweetgum forest. Forested acres occur in relatively small forest stands scattered throughout the Island and are interconnected by hedgerows consisting primarily of black cherry and locust. Forest stands range from one to more than 100 years old, and function as buffer zones and corridors utilized by a variety of species. Forested refuge land also provides nesting trees and roosting areas for the bald eagle, and for two high priority PIF species — wood thrush and Eastern wood pewee, and for six moderate- or low-priority PIF species.

Because of the interspersed nature of other cover types, there are no relatively large contiguous blocks of 100+ acres of forest that would help support forest-interior dwelling (FIDS) birds that prefer such habitat (see text box). Service migratory bird experts suggest that because of the island's isolation, even if it were totally forested, it would contribute limited FIDS breeding habitat and would not be a regionally significant contributor to sustaining FIDS populations (Dettmers pers comm. 2007). Our task was to prescribe an amount and distribution of forest habitat on the refuge, with emphasis on larger, contiguous forested areas, and intact riparian and shoreline buffers.

#### *Other Potential Habitat Values*

An additional directive for achieving refuge purposes and the Refuge System mission is related to biological integrity, diversity, and environmental health (BIDEH). This requires that we consider and protect the broad spectrum of native fish, wildlife, plant, and habitat resources found on a refuge:

#### **FIDS Habitat Criteria**

The Chesapeake Bay Critical Area Program was established in 1984 with the passage of the Critical Area Act in the State of Maryland. The law mandated the development of regulations (Critical Area Criteria) to protect water quality, conserve plant and wildlife habitat and direct growth and development. One of the requirements of the Criteria is the protection and conservation of breeding habitat for forest interior dwelling birds (FIDS) (CAC 2001). The Criteria identify two FIDS habitat types for which conservation is mandated:

- (1) Existing riparian forests (for example, those relatively mature forests of at least 300 feet in width which occur adjacent to streams, wetlands, or the Bay shoreline, which are documented breeding areas)
- (2) Forest areas utilized as breeding areas by forest interior dwelling birds and other wildlife species (for example, relatively mature forested areas within the Critical Area of 100 acres or more, or forest connected with these areas)

Although both habitat type descriptions mention minimum areas, some smaller forested areas may also support FIDS as well, depending on the characteristics of the forest tract and surrounding landscape. FIDS habitat may be absent in forests larger than 100 acres. Therefore, in addition to considering the acreage of a forest when identifying potential FIDS habitat, forest characteristics like forest age, shape, forest edge-to-area ratio, vegetative structure and composition, topography and degree of human disturbance should be taken into consideration as well as the character of the surrounding landscape, including proximity to large forested areas, percent of contiguous forest in surrounding area, habitat quality of nearby forest tracts and adjacent land uses (CAC 2001).

“In administering the System, the Secretary shall...ensure that the biological integrity, diversity, and environmental health of the System are maintained for the benefit of present and future generations of Americans...” (Refuge Improvement Act, Section 4(a)(4)(B)).

The *Policy on Biological Integrity, Diversity and Environmental Health* (601 FW 3.3) is the Service’s statement of how it will implement this mandate. The policy provides information and guidance to manage refuges in such a way as to prevent degradation of BIDEH. It also offers ways to restore lost or severely degraded ecological components, where appropriate.

The policy explains the relationships among BIDEH, the NWRS mission, and refuge purposes as follows:

“...each refuge will be managed to fulfill refuge purpose(s) as well as to help fulfill the System mission, and we will accomplish these purpose(s) and our mission by ensuring that the biological integrity, diversity, and environmental health of each refuge are maintained, and where appropriate, restored.” (601 FW 3[3.7B]).

At the refuge, within a landscape that has been managed for centuries, we needed to consider ways to meet our biological integrity, diversity and environmental health mandate. Could we enhance our capabilities through research and demonstration projects? Could we maintain a diversity of habitats of substantive benefit to wildlife?

Small grassland and shrubland areas on the refuge add to refuge habitat diversity and to overall refuge biodiversity, but we needed to determine to what extent resources devoted to their management would be of substantive value to Federal trust species or other species of concern. We considered to what extent we should divert resources and habitat space that would otherwise support waterfowl and their habitats to manage for this diversity.

Grasslands. We currently maintain approximately 31 acres of grasslands, primarily in one field near the former refuge headquarters, which we plant with native grasses and wildflowers to benefit migratory butterflies, particularly the monarch butterfly, as well as grassland songbird species and birds of prey. We have conducted prescribed burning to help maintain these grasslands, rather than letting them convert to shrub habitat. Large expanses of grasslands are crucial for grassland dependent species such as the eastern meadowlark and the grasshopper sparrow. Grasslands are in limited availability throughout the region, and therefore many grassland bird species have been in decline throughout the east. Refuge lands, however, have limited capability to provide productive grassland bird habitat of this size for those species. Many people advocate maintaining the fields near the former headquarters as a wildlife viewing area due to the concentrations of butterflies. Thus, we needed to consider to what extent Eastern Neck Refuge should continue to provide this habitat.

Shrublands. Approximately 18 acres of upland and wetland shrub habitat occurs on the refuge. Upland shrub habitat is primarily associated with field hedgerows or the early stages of forest development. Shrubland bird species, such as the yellow-breasted chat and white-eyed vireo, are documented on the refuge, but are not thought to be well-distributed or densely populated. Some biologists advocate that we expand upland shrub habitat on the refuge, beyond that provided by hedgerows, due to the increasing number of breeding and migrating birds of conservation concern that rely on this habitat. However, there is also concern that maintaining shrubland in hedgerows would exacerbate the already major



problem of invasive plants, such as mile-a-minute, that prefer those areas and also contribute to further fragmenting the croplands important to wintering waterfowl. Some shrub habitat is created as we pursue those forest objectives that transition fields to forest, but it is only transitional or temporary until trees establish.

Wetland shrub-scrub habitat, comprised of hightide bush, bayberry, and wax myrtle, exists along all forest and marsh fringe areas and other high areas throughout the tidal marsh. This may constitute a sufficient acreage to maintain this habitat diversity component without active management. In the uplands, however, maintaining a permanent, healthy, native shrub community would likely be labor intensive and expensive. Thus, we needed to decide whether the benefits of actively managing for this habitat support the effort.

### **How can we enhance research opportunities at the refuge to help us to make better refuge management decisions?**

We believe that support of high quality scientific research related to our management concerns should continue to be a significant part of our mission on Eastern Neck Refuge. Unfortunately, limited research is presently occurring. The refuge's unique and rich resources, however, provide great opportunities for further study. Furthermore, Hails Point Marsh is designated as a Research Natural Area, and the refuge and surrounding waters are listed as a Wetland of International Importance by the RAMSAR Convention. See chapter 3, "Refuge and Resource Descriptions," for additional details on the RAMSAR listing.

Many conservation land managers are concerned by the lack of scientific data available about wildlife populations, their habitats, and effects of management actions needed to inform decision-making. This is particularly important to support adaptive management programs, when habitat-specific rather than species-specific management is being emphasized, when promoting biodiversity has become an almost universal management goal, when long-term ecological monitoring is considered a critical component by the scientific community, and when the occurrence of rare species is of both public and regulatory interest. Public comment encourages the refuge to conserve and restore natural habitats, and to monitor conditions in partnership with state agencies, other Federal agencies, NGOs, universities, and research institutions.

We received recommendations that we should pursue a more active research, inventory and monitoring program. Four specific information gaps were identified and there were recommendations that we implement the following:

- 9) A baseline inventory of the occurrence and spatial distribution of flora and selected fauna;
- 10) A long-term monitoring program to determine climate change-related trends in selected flora and fauna;
- 11) An adaptive management program to guide significant habitat and population management actions;
- 12) Detailed research into habitat-species relationships. Some of the more obvious relationships for investigation are waterfowl use of managed refuge habitats and habitat requirements for species of conservation concern.

Our task was to determine to what extent we could facilitate research over the next 15 years, and what research studies should be a priority for the refuge.

### **What demonstration projects should we continue to support?**

Resources are limited and some people claim that we should focus where the greatest long term benefit to resources and society is predicted. We heard a range of opinions on whether or not to dedicate limited resources in continuing to promote the refuge as a demonstration area, principally for renewable energy and green business practices, best management farming and forestry practices, and shoreline and habitat restoration for habitat diversity.

During the planning process, we evaluated whether to modify those demonstration projects. We also evaluated opportunities for new programs related to freshwater impoundments and invasive plant management. The refuge's BayScape project, which is part of a regional program that promotes native, regional vegetation attractive to wildlife and requires minimal input of water and chemicals, could be better promoted. Our plans for each of these programs are outlined in chapter 4.

### **Issue Area 3. How can we address the effects of expanding human populations and increasing recreational demand in the Chesapeake Bay region on Service trust resources at the refuge?**

The Bay region's rapid population growth has led to increasing demand for outdoor oriented recreation on Maryland's Eastern Shore. In 2007, the refuge provided more than 55,000 visitors the opportunity to learn about and view waterfowl, rare species, and other wildlife. This visitation has been accompanied by increasing occurrences of unintentional and sometimes deliberate disturbance of wildlife and damage to refuge resources and property.

Our task was to determine the level and mix of recreational opportunities to allow, while still protecting wildlife resources. We address this issue area through our objectives and strategies in chapter 4, under goal 3.

### **How can we maintain or expand recreational, interpretive and educational opportunities on the refuge given our limited resources?**

Managed as part of the CM Refuge Complex, Eastern Neck Refuge shares staff and funding resources with the other refuges in the Refuge Complex. Appendix D includes the current, approved staffing chart for the CM Refuge Complex and identifies which positions would be housed at Eastern Neck Refuge. Our task in developing the CCP was to determine how best to develop wildlife, habitat, and visitor services programs based on this anticipated staffing level, including our capability to enforce regulations. Ultimately, however, decisions on staffing are decided by the Project Leader for the Refuge complex.

We heard recommendations for increased access, more trails, more parking, and better designed boat launch sites. Environmental education was the most requested program; specifically, expanding partnerships with educational institutions was recommended.

### **How can we best address unauthorized uses or damage to refuge property?**

#### *Control of illegal access by boaters*

Boat launching facilities at Bogles Wharf and Ingleside allow legal access for motorized and non-motorized watercraft to the Chester River and Chesapeake Bay. However, access to the refuge along its 15 miles of shoreline is restricted because boat landings can cause shoreline erosion, habitat damage, wildlife disturbance, including disturbance to nesting bald eagles. Our challenge was to determine how best to develop effective outreach and education programs about closed areas, and in turn, enforce those regulations. One example is the recent development of a self-guided kayak trail around the island includes interpretive signage that enhances the viewing experience along the shoreline, while also warning against encroachment and landings at unauthorized locations.

*Control of vandalism at the north end of the refuge*

County Road 445, locally known as Eastern Neck Road, where it heads south onto the refuge at the Eastern Neck Narrows bridge and ends at Bogles Wharf, provides access to the northern 1/4 of the refuge from official sunrise to official sunset seven days a week. Continuing south, just beyond the Bogles Wharf turn-off, the road has a gate which is typically open between 7:30 am and ½ hour after official sunset. Without regular monitoring and enforcement, the ungated road on the northern portion of the refuge essentially provides unrestricted access to that section of the refuge and has led to incidents of damage to refuge property, including damage to the wildlife observation tower at Turkey Cove, damage of facilities at the Tundra Swan boardwalk, and of littering and campfires by picnickers away from authorized locations.

Our challenge was to determine how best to conduct effective monitoring and law enforcement of these sites given our resource limits.

**Issue Area 4. How can we best address potential effects on cultural and historic resources?**

The refuge has a rich history of Native American habitation and, since the time of European settlement of the Bay region, as a center of fishing and shellfishing activities on the Bay, commerce on the Chester River, and farming and waterfowl hunting. The refuge has many identified cultural sites. Unfortunately, we do not have a complete inventory for the refuge. Primarily, we have been surveying specific project areas before we implement any action, so the current inventory areas are scattered across the refuge.

Among the substantive concerns we will continue to address with respect to cultural and historic resources are:

- 1) Effects of shoreline erosion on archeological sites
- 2) Looting of archeological sites
- 3) Maintenance of historic structures

Because Federal laws protect these cultural resources these issues are addressed through our objectives and strategies under goal 1.

**How can we protect archaeological sites that are uncovered along the unstable refuge shoreline?**

Not only does shoreline erosion threaten the physical integrity of the island and its wildlife habitats, but it also threatens exposure and loss of archaeological sites or artifacts. We address shoreline erosion under goal 1 by identifying actions to pursue to stabilizing the shoreline. However, recovery and stabilization can be a long process and some continued loss is anticipated.

During the course of implementing shoreline protection projects, we may discover new archeological sites or artifacts. In addition, refuge staff and/or visitors may locate new ones at any time. We will make sure that steps are taken to follow proper procedures for recording and disposition of any new sites or artifacts located.

**How can we best identify and protect archeological resources on refuge lands?**

Artifact collecting was a common activity prior to refuge establishment. However, this practice is not allowed on refuge lands as it violates Federal laws protecting historic and cultural sites. When an artifact is removed from its original location, both the object and its context are lost.

Since all of the sites and artifacts on the refuge are now protected by Federal and State law, visitors are instructed that if they discover any artifacts on the refuge, to leave the object in place and report its location to the refuge staff.

Unfortunately, looting remains an occasional issue. We will continue to be vigilant about its enforcement to the best of our capabilities.

**How do we maintain the historic buildings, proposed or listed on the National Register, in keeping with their historic character, but also making them functional to our needs?**

The current refuge headquarters is eligible for National Historic Register listing and is being carefully rehabilitated to preserve its historic character. This rehabilitation is very expensive and funding its long-term maintenance is also a concern. We will continue to seek funding and implement projects to protect its integrity.